

3.5 Answers

GCSE Mathematics Simultaneous Equations III

3.5.1 Solution to 3.2 The Theory

Knowing that quadratics factorise into $(x + A)(x + B)$ means that the process can be “reverse engineered” by expanding the brackets.

$$\begin{aligned}(x + A)(x + B) &= x^2 + Ax + Bx + AB \\ &= x^2 + (A + B)x + AB\end{aligned}$$

Compare this with $y = x^2 + bx + c$ (where $a = 1$)

$$A + B = b \text{ and } AB = c$$

3.5.2 Solution to 3.3 Three Examples

Example #1

Factorise $y = x^2 + 11x + 24$

A	B
1	24
2	12
3	8
4	6

<===

$$y = (x + 3)(x + 8)$$

Example #2

Factorise $y = x^2 + 3x - 10$

A	B
-1	10
-2	5
-5	2
-10	1

<===

$$y = (x - 2)(x + 5)$$

Example #3

Factorise $y = 3x^2 - 15x + 18$

$$y = 3(x^2 - 5x + 6)$$

A	B
-2	-3

<===

$$y = 3(x - 2)(x - 3)$$

3.5.2 Solutions to 3.4 Exercise

Answer 1

(i) $y = (x + 3)(x + 7)$

(iii) $y = (x + 2)(x + 7)$

(v) $y = (x + 3)(x + 11)$

(vii) $y = (x + 1)(x + 9)$

(ix) $y = 10(x + 6)(x + 8)$

(ii) $y = (x + 5)(x + 6)$

(iv) $y = (x + 3)(x + 5)$

(vi) $y = (x + 3)^2$

(viii) $y = (x + 1)(x + 13)$

(x) $y = 2(x + 7)(x + 11)$

Answer 2

(i) $y = (x + 3)(x - 1)$

(iii) $y = (x + 11)(x - 2)$

(v) $y = (x - 5)(x + 3)$

(vii) $y = (x - 10)(x + 2)$

(ix) $y = 3(x - 8)(x + 5)$

(ii) $y = (x + 7)(x - 2)$

(iv) $y = (x + 5)(x - 3)$

(vi) $y = (x - 7)(x + 3)$

(viii) $y = (x - 11)(x + 3)$

(x) $y = 5(x - 10)(x + 4)$

Answer 3

(i) $y = (x - 2)(x - 3)$

(iii) $y = (x - 3)(x - 7)$

(v) $y = (x - 5)^2$

(vii) $y = (x - 8)(x - 2)$

(ix) $y = 4(x - 4)(x - 11)$

(ii) $y = (x - 3)(x - 5)$

(iv) $y = (x - 4)(x - 5)$

(vi) $y = (x - 6)(x - 1)$

(viii) $y = (x - 6)(x - 2)$

(x) $y = 10(x - 7)^2$

Answer 4

(i) $y = (x + 5)(x + 10)$

(iii) $y = (x - 5)(x - 10)$

(ii) $y = (x + 10)(x - 5)$

(iv) $y = (x - 10)(x + 5)$

Answer 5

$A = 6, B = 7$ (or vice versa)

Answer 6

$A = -12$ or $B = 17$ (or vice versa)